



## SEQUENCE LISTING

<110> Bertin, John

<120> NOVEL MOLECULES OF THE NBS/LRR PROTEIN FAMILY AND USES THEREOF

<130> 07334-268001

<140> US 09/848,035

<141> 2001-05-03

<150> US 60/201,464

<151> 2000-05-03

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Leu Asn Glu Asp Glu Leu Lys Ser Phe Lys Ser Leu Leu Trp Ala Phe  
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ccc ctc gaa gac gtg cta cag aag acc cca tgg tct gag gtg gaa gag 144  
Pro Leu Glu Asp Val Leu Gln Lys Thr Pro Trp Ser Glu Val Glu Glu  
35 40 45

gct gat ggc aag aaa ctg gca gaa att ctg gtc aac acc tcc tca gaa 192  
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acg gaa ttg tgt aag atg gca aag gct gag atg gag gac gga cag 288  
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Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser  
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aat ttc cat gac gac gtc act ctg aga aac caa cgg ttc att cca ttc Asn Phe His Asp Asp Val Thr Leu Arg Asn Gln Arg Phe Ile Pro Phe 145 150 155 160	480
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ctg gac tgg aca gac tgc aac ctc agc ccg acg ctc aga tac gcg ttc Leu Asp Trp Thr Asp Cys Asn Leu Ser Pro Thr Leu Arg Tyr Ala Phe 195 200 205	624
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 Glu Leu Ala Lys Pro Gly Glu Lys Glu Gly Trp Arg Asn Ser Met Glu  
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 His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met  
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A1

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 Val Cys Thr Thr Leu Lys Leu Gln Met Glu Lys Gly Glu Asp Pro Pro  
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A1

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aaa gaa gaa ctg gct aac gtg ttg cca atc tct tat gag gga cag tat 192  
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ata tgg aat atg ctc ttc agc ata ttt tca atg atg cgt aag gaa gat 240  
 Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp  
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A1  
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ctc atg gag gtt aca gtt tac ctt caa tca gac aag gat atg atg gtc 1632  
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 Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp 80  
 65 70 75 80  
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 85 90 95  
 Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Tyr Ser Ala Asn Asn Leu Asn 110  
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 275 280 285  
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 290 295 300

A1

Leu Cys Trp Ile Thr Cys Thr Val Leu Lys Arg Gln Met Asp Lys Gly  
 305 310 315 320  
 Arg Asp Phe Gln Leu Cys Cys Gln Thr Pro Thr Asp Leu His Ala His  
 325 330 335  
 Phe Leu Ala Asp Ala Leu Thr Ser Glu Ala Gly Leu Thr Ala Asn Gln  
 340 345 350  
 Tyr His Leu Gly Leu Leu Lys Arg Leu Cys Leu Leu Ala Ala Gly Gly  
 355 360 365  
 Leu Phe Leu Ser Thr Leu Asn Phe Ser Gly Glu Asp Leu Arg Cys Val  
 370 375 380  
 Gly Phe Thr Glu Ala Asp Val Ser Val Leu Gln Ala Ala Asn Ile Leu  
 385 390 395 400  
 Leu Pro Ser Asn Thr His Lys Asp Arg Tyr Lys Phe Ile His Leu Asn  
 405 410 415  
 Val Gln Glu Phe Cys Thr Ala Ile Ala Phe Leu Met Ala Val Pro Asn  
 420 425 430  
 Tyr Leu Ile Pro Ser Gly Ser Arg Glu Tyr Lys Glu Lys Arg Glu Gln  
 435 440 445  
 Tyr Ser Asp Phe Asn Gln Val Phe Thr Phe Ile Phe Gly Leu Leu Asn  
 450 455 460  
 Ala Asn Arg Arg Lys Ile Leu Glu Thr Ser Phe Gly Tyr Gln Leu Pro  
 465 470 475 480  
 Met Val Asp Ser Phe Lys Trp Tyr Ser Val Gly Tyr Met Lys His Leu  
 485 490 495  
 Asp Arg Asp Pro Glu Lys Leu Thr His His Met Pro Leu Phe Tyr Cys  
 500 505 510  
 Leu Tyr Glu Asn Arg Glu Glu Glu Phe Val Lys Thr Ile Val Asp Ala  
 515 520 525  
 Leu Met Glu Val Thr Val Tyr Leu Gln Ser Asp Lys Asp Met Met Val  
 530 535 540  
 Ser Leu Tyr Cys Leu Asp Tyr Cys Cys His Leu Arg Thr Leu Lys Leu  
 545 550 555 560  
 Ser Val Gln Arg Ile Phe Gln Asn Lys Glu Pro Leu Ile Arg Pro Thr  
 565 570 575  
 Ala Ser Gln Met Lys Ser Leu Val Tyr Trp Arg Glu Ile Cys Ser Leu  
 580 585 590  
 Phe Tyr Thr Met Glu Ser Leu Arg Glu Leu His Ile Phe Asp Asn Asp  
 595 600 605  
 Leu Asn Gly Ile Ser Glu Arg Ile Leu Ser Lys Ala Leu Glu His Ser  
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 Ser Cys Lys Leu Arg Thr Leu  
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 1 5 10 15

gac cac gta tat atc cgt aat aca tca aag gac gaa cat gag gaa ctg	96
Asp His Val Tyr Ile Arg Asn Thr Ser Lys Asp Glu His Glu Glu Leu	
20 25 30	
cag cgc cta ctg gat cct aat agg act aga gcc cag gcc cag acg ata	144
Gln Arg Leu Leu Asp Pro Asn Arg Thr Arg Ala Gln Ala Gln Thr Ile	
35 40 45	
gtc ttg gtg ggg agg gca ggg gtt ggg aag acc acc ttg gca atg cag	192
Val Leu Val Gly Arg Ala Gly Val Gly Lys Thr Thr Leu Ala Met Gln	
50 55 60	
gct atg ctg cac tgg gca aat gga gtt ctc ttt cag caa agg ttc tcc	240
Ala Met Leu His Trp Ala Asn Gly Val Leu Phe Gln Gln Arg Phe Ser	
65 70 75 80	
tat gtt ttc tat ctc agc tgc cat aaa ata agg tac atg aag gaa act	288
Tyr Val Phe Tyr Leu Ser Cys His Lys Ile Arg Tyr Met Lys Glu Thr	
85 90 95	
acc ttt gct gaa ttg att tct ttg gat tgg ccc gat ttt gat gcc ccc	336
Thr Phe Ala Glu Leu Ile Ser Leu Asp Trp Pro Asp Phe Asp Ala Pro	
100 105 110	
att gaa gag ttc atg tct caa cca gag aag ctc ctg ttt att att gat	384
Ile Glu Glu Phe Met Ser Gln Pro Glu Lys Leu Leu Phe Ile Ile Asp	
115 120 125	
ggc ttt gag gaa ata atc ata tct gag tca cgc tct gag agc ttg gat	432
Gly Phe Glu Glu Ile Ile Ser Glu Ser Arg Ser Glu Ser Leu Asp	
130 135 140	
gat ggc tcg cca tgt aca gac tgg tac cag gag ctc cca gtg acc aaa	480
Asp Gly Ser Pro Cys Thr Asp Trp Tyr Gln Glu Leu Pro Val Thr Lys	
145 150 155 160	
atc cta cac agc ttg ttg aag aaa gaa ttg gtt ccc ctg gct acc tta	528
Ile Leu His Ser Leu Leu Lys Lys Glu Leu Val Pro Leu Ala Thr Leu	
165 170 175	
ctg atc acg atc aag acc tgg ttt gtg aga gat ctt aag gcc tca tta	576
Leu Ile Thr Ile Lys Thr Trp Phe Val Arg Asp Leu Lys Ala Ser Leu	
180 185 190	
gtg aat cca tgc ttt gta caa att aca ggg ttc aca ggg gac gac cta	624
Val Asn Pro Cys Phe Val Gln Ile Thr Gly Phe Thr Gly Asp Asp Leu	
195 200 205	
cgg gta tat ttc atg aga cac ttt gat gac tca agt gaa gtt gag aaa	672
Arg Val Tyr Phe Met Arg His Phe Asp Asp Ser Ser Glu Val Glu Lys	
210 215 220	
atc ctg cag cag cta aga aaa aac gaa act ctc ttt cat tcc tgc agt	720
Ile Leu Gln Gln Leu Arg Lys Asn Glu Thr Leu Phe His Ser Cys Ser	
225 230 235 240	

A1

gcc ccc atg gtg tgt tgg acc gta tgt tcc tgt ctg aag cag ccg aag Ala Pro Met Val Cys Trp Thr Val Cys Ser Cys Leu Lys Gln Pro Lys 245 250 255	768
gtg agg tat tac gat ctc cag tca atc act cag act acc acc agt ctg Val Arg Tyr Tyr Asp Leu Gln Ser Ile Thr Gln Thr Thr Ser Leu 260 265 270	816
tat gcc tat ttt ttc tcc aac ttg ttc tcc aca gca gag gta gat ttg Tyr Ala Tyr Phe Phe Ser Asn Leu Phe Ser Thr Ala Glu Val Asp Leu 275 280 285	864
gca gat gac agc tgg cca gga caa tgg agg gcc ctc tgc agt ctg gcc Ala Asp Asp Ser Trp Pro Gly Gln Trp Arg Ala Leu Cys Ser Leu Ala 290 295 300	912
ata gaa ggg ctg tgg tct atg aac ttc acg ttt aac aaa gaa gac act Ile Glu Gly Leu Trp Ser Met Asn Phe Thr Phe Asn Lys Glu Asp Thr 305 310 315 320	960
gag atc gag ggc ctg gaa gtg cct ttc att gat tct ctc tac gag ttc Glu Ile Glu Gly Leu Glu Val Pro Phe Ile Asp Ser Leu Tyr Glu Phe 325 330 335	1008
aat att ctt caa aag atc aat gac tgt ggg ggt tgc act act ttc acc Asn Ile Leu Gln Lys Ile Asn Asp Cys Gly Cys Thr Phe Thr 340 345 350	1056
<i>A1</i>	
cac cta agt ttc cag gag ttt ttt gca gcc atg tcc ttt gtg cta gag His Leu Ser Phe Gln Glu Phe Ala Ala Met Ser Phe Val Leu Glu 355 360 365	1104
gaa cct aga gaa ttc cct ccc cat tcc aca aag cca caa gag atg aag Glu Pro Arg Glu Phe Pro His Ser Thr Lys Pro Gln Glu Met Lys 370 375 380	1152
atg tta ctg caa cac gtc ttg ctt gac aaa gaa gcc tac tgg act cca Met Leu Leu Gln His Val Leu Leu Asp Lys Glu Ala Tyr Trp Thr Pro 385 390 395 400	1200
gtg gtt ctg ttc ttc ttt ggt ctt tta aat aaa aac ata gca aga gaa Val Val Leu Phe Phe Gly Leu Leu Asn Lys Asn Ile Ala Arg Glu 405 410 415	1248
ctg gaa gat act ttg cat tgt aaa ata tct ccc agg gta atg gag gaa Leu Glu Asp Thr Leu His Cys Lys Ile Ser Pro Arg Val Met Glu Glu 420 425 430	1296
tta tta aag tgg gga gaa gag tta ggt aag gct gaa agt gcc tct ctc Leu Leu Lys Trp Gly Glu Glu Leu Gly Lys Ala Glu Ser Ala Ser Leu 435 440 445	1344
caa ttt cac att cta cga ctt ttt cac tgc cta cac gag tcc cag gag Gln Phe His Ile Leu Arg Leu Phe His Cys Leu His Glu Ser Gln Glu 450 455 460	1392

gaa gac ttc aca aag aag atg ttg ggt cgt atc ttt gaa gtt gac ctt	1440
Glu Asp Phe Thr Lys Lys Met Leu Gly Arg Ile Phe Glu Val Asp Leu	
465 470 475 480	
aat att ttg gag gac gaa ctc caa gct tct tca ttt tgc cta aag	1488
Asn Ile Leu Glu Asp Glu Glu Leu Gln Ala Ser Ser Phe Cys Leu Lys	
485 490 495	
cac tgt aaa agg tta aat aag cta agg ctt tct gtt agc agt cac atc	1536
His Cys Lys Arg Leu Asn Lys Leu Arg Leu Ser Val Ser Ser His Ile	
500 505 510	
ctt gaa agg gac ttg gaa att ctg gag tga	1566
Leu Glu Arg Asp Leu Glu Ile Leu Glu	
515 520	
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Asp His Val Tyr Ile Arg Asn Thr Ser Lys Asp Glu His Glu Glu Leu	
20 25 30	
Gln Arg Leu Leu Asp Pro Asn Arg Thr Arg Ala Gln Ala Gln Thr Ile	
35 40 45	
Val Leu Val Gly Arg Ala Gly Val Gly Lys Thr Thr Leu Ala Met Gln	
50 55 60	
Ala Met Leu His Trp Ala Asn Gly Val Leu Phe Gln Gln Arg Phe Ser	
65 70 75 80	
Tyr Val Phe Tyr Leu Ser Cys His Lys Ile Arg Tyr Met Lys Glu Thr	
85 90 95	
Thr Phe Ala Glu Leu Ile Ser Leu Asp Trp Pro Asp Phe Asp Ala Pro	
100 105 110	
Ile Glu Glu Phe Met Ser Gln Pro Glu Lys Leu Leu Phe Ile Ile Asp	
115 120 125	
Gly Phe Glu Glu Ile Ile Ile Ser Glu Ser Arg Ser Glu Ser Leu Asp	
130 135 140	
Asp Gly Ser Pro Cys Thr Asp Trp Tyr Gln Glu Leu Pro Val Thr Lys	
145 150 155 160	
Ile Leu His Ser Leu Leu Lys Lys Glu Leu Val Pro Leu Ala Thr Leu	
165 170 175	
Leu Ile Thr Ile Lys Thr Trp Phe Val Arg Asp Leu Lys Ala Ser Leu	
180 185 190	
Val Asn Pro Cys Phe Val Gln Ile Thr Gly Phe Thr Gly Asp Asp Leu	
195 200 205	
Arg Val Tyr Phe Met Arg His Phe Asp Asp Ser Ser Glu Val Glu Lys	
210 215 220	
Ile Leu Gln Gln Leu Arg Lys Asn Glu Thr Leu Phe His Ser Cys Ser	
225 230 235 240	
Ala Pro Met Val Cys Trp Thr Val Cys Ser Cys Leu Lys Gln Pro Lys	
245 250 255	
Val Arg Tyr Tyr Asp Leu Gln Ser Ile Thr Gln Thr Thr Ser Leu	
260 265 270	

Tyr Ala Tyr Phe Phe Ser Asn Leu Phe Ser Thr Ala Glu Val Asp Leu  
 275 280 285  
 Ala Asp Asp Ser Trp Pro Gly Gln Trp Arg Ala Leu Cys Ser Leu Ala  
 290 295 300  
 Ile Glu Gly Leu Trp Ser Met Asn Phe Thr Phe Asn Lys Glu Asp Thr  
 305 310 315 320  
 Glu Ile Glu Gly Leu Glu Val Pro Phe Ile Asp Ser Leu Tyr Glu Phe  
 325 330 335  
 Asn Ile Leu Gln Lys Ile Asn Asp Cys Gly Gly Cys Thr Thr Phe Thr  
 340 345 350  
 His Leu Ser Phe Gln Glu Phe Phe Ala Ala Met Ser Phe Val Leu Glu  
 355 360 365  
 Glu Pro Arg Glu Phe Pro Pro His Ser Thr Lys Pro Gln Glu Met Lys  
 370 375 380  
 Met Leu Leu Gln His Val Leu Leu Asp Lys Glu Ala Tyr Trp Thr Pro  
 385 390 395 400  
 Val Val Leu Phe Phe Gly Leu Leu Asn Lys Asn Ile Ala Arg Glu  
 405 410 415  
 Leu Glu Asp Thr Leu His Cys Lys Ile Ser Pro Arg Val Met Glu Glu  
 420 425 430  
 Leu Leu Lys Trp Gly Glu Glu Leu Gly Lys Ala Glu Ser Ala Ser Leu  
 435 440 445  
 Gln Phe His Ile Leu Arg Leu Phe His Cys Leu His Glu Ser Gln Glu  
 450 455 460  
 Glu Asp Phe Thr Lys Lys Met Leu Gly Arg Ile Phe Glu Val Asp Leu  
 465 470 475 480  
 Asn Ile Leu Glu Asp Glu Glu Leu Gln Ala Ser Ser Phe Cys Leu Lys  
 485 490 495  
 His Cys Lys Arg Leu Asn Lys Leu Arg Leu Ser Val Ser Ser His Ile  
 500 505 510  
 Leu Glu Arg Asp Leu Glu Ile Leu Glu  
 515 520

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 <213> Homo sapiens

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 Ser Arg Leu Trp Ser Ser Lys Ser Val Thr Glu Ile His Leu Tyr Phe  
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gag gag gaa gtc aag caa gaa gaa tgt gac cat ttg gac cgc ctt ttt 97  
 Glu Glu Val Lys Gln Glu Glu Cys Asp His Leu Asp Arg Leu Phe  
 20 25 30

gct ccc aag gaa gct ggg aaa cag cca cgt aca gtg atc att caa gga 145  
 Ala Pro Lys Glu Ala Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly  
 35 40 45

cca caa gga att gga aaa acg aca ctc ctg atg aag ctg atg atg gcc	193
Pro Gln Gly Ile Gly Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala	
50 55 60	
tgg tcg gac aac aag atc ttt cgg gat agg ttc ctg tac acg ttc tat	241
Trp Ser Asp Asn Lys Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr	
65 70 75 80	
ttc tgc tgc aga gaa ctg agg gag ttg ccg cca acg agt ttg gct gac	289
Phe Cys Cys Arg Glu Leu Arg Glu Leu Pro Pro Thr Ser Leu Ala Asp	
85 90 95	
ttg att tcc aga gag tgg cct gac ccc gct gct cct ata aca gag atc	337
Leu Ile Ser Arg Glu Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile	
100 105 110	
gtg tct caa ccg gag aga ctc ttg ttc gtc atc gac agc ttc gaa gag	385
Val Ser Gln Pro Glu Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu	
115 120 125	
ctg cag ggc ggc ttg aac gaa ccc gat tcg gat ctg tgt ggt gac ttg	433
Leu Gln Gly Gly Leu Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu	
130 135 140	
atg gag aaa cgg ccg gtg cag gtg ctt ctg agc agt ttg ctg agg aag	481
Met Glu Lys Arg Pro Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys	
145 150 155 160	
<i>A1</i>	
aag atg ctc ccg gag gcc tcc ctg ctc atc gct atc aaa ccc gtg tgc	529
Lys Met Leu Pro Glu Ala Ser Leu Leu Ile Ala Ile Lys Pro Val Cys	
165 170 175	
ccg aag gag ctc ccg gat cag gtg acg atc tca gaa atc tac cag ccc	577
Pro Lys Glu Leu Arg Asp Gln Val Thr Ile Ser Glu Ile Tyr Gln Pro	
180 185 190	
cgg gga ttc aac gag agt gat agg tta gtg tat ttc tgc tgt ttc ttc	625
Arg Gly Phe Asn Glu Ser Asp Arg Leu Val Tyr Phe Cys Cys Phe Phe	
195 200 205	
aaa gac ccg aaa aga gcc atg gaa gcc ttc aat ctt gta aga gaa agt	673
Lys Asp Pro Lys Arg Ala Met Glu Ala Phe Asn Leu Val Arg Glu Ser	
210 215 220	
gaa cag ctg ttt tcc ata tgc caa atc ccg ctc ctc tgc tgg atc ctg	721
Glu Gln Leu Phe Ser Ile Cys Gln Ile Pro Leu Leu Cys Trp Ile Leu	
225 230 235 240	
tgt acc agt ctg aag caa gag atg cag aaa gga aaa gac ctg gcc ctg	769
Cys Thr Ser Leu Lys Gln Glu Met Gln Lys Gly Lys Asp Leu Ala Leu	
245 250 255	
acc tgc cag agc act acc tct gtg tac tcc tct ttc gtc ttt aac ctg	817
Thr Cys Gln Ser Thr Ser Val Tyr Ser Ser Phe Val Phe Asn Leu	
260 265 270	

ttc aca cct gag ggt gcc gag ggc ccg act ccg caa acc acc cag cac cag	865
Phe Thr Pro Glu Gly Ala Glu Gly Pro Thr Pro Gln Thr Gln His Gln	
275 280 285	
ctg aag gcc ctg tgc tcc ctg gct gca gag ggt atg tgg aca gac aca	913
Leu Lys Ala Leu Cys Ser Leu Ala Ala Glu Gly Met Trp Thr Asp Thr	
290 295 300	
ttt gag ttt tgt gaa gac gac ctc cgg aga aat ggg gtt gtt gac gct	961
Phe Glu Phe Cys Glu Asp Asp Leu Arg Arg Asn Gly Val Val Asp Ala	
305 310 315 320	
gac atc cct gcg ctg ctg ggc acc aag ata ctt ctg aag tac ggg gag	1009
Asp Ile Pro Ala Leu Leu Gly Thr Lys Ile Leu Leu Lys Tyr Gly Glu	
325 330 335	
cgt gag agc tcc tac gtg ttc ctc cac gtg tgt atc cag gag ttc tgt	1057
Arg Glu Ser Ser Tyr Val Phe Leu His Val Cys Ile Gln Glu Phe Cys	
340 345 350	
gcc gcc ttg ttc tat ttg ctc aag agc cac ctt gat cat cct cac cca	1105
Ala Ala Leu Phe Tyr Leu Leu Lys Ser His Leu Asp His Pro His Pro	
355 360 365	
gct gtg aga tgt gta cag gaa ttg cta gtt gcc aat ttt gaa aaa gca	1153
Ala Val Arg Cys Val Gln Glu Leu Leu Val Ala Asn Phe Glu Lys Ala	
370 375 380	
AI	
agg aga gca cat tgg att ttt ttg ggg tgt ttt cta act ggc ctt tta	1201
Arg Arg Ala His Trp Ile Phe Leu Gly Cys Phe Leu Thr Gly Leu Leu	
385 390 395 400	
aat aaa aag gaa caa gaa aaa ctg gat gcg ttt ttt ggc ttc caa ctg	1249
Asn Lys Lys Glu Gln Glu Lys Leu Asp Ala Phe Phe Gly Phe Gln Leu	
405 410 415	
tcc caa gag ata aag cag caa att cac cag tgc ctg aag agc tta ggg	1297
Ser Gln Glu Ile Lys Gln Gln Ile His Gln Cys Leu Lys Ser Leu Gly	
420 425 430	
gag cgt ggc aat cct cag gga cag gtg gat tcc ttg gcg ata ttt tac	1345
Glu Arg Gly Asn Pro Gln Gly Gln Val Asp Ser Leu Ala Ile Phe Tyr	
435 440 445	
tgt ctc ttt gaa atg cag gat cct gcc ttt gtg aag cag gca gtg aac	1393
Cys Leu Phe Glu Met Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn	
450 455 460	
ctc ctc caa gaa gct aac ttt cat att att gac aac gtg gac ttg gtg	1441
Leu Leu Gln Glu Ala Asn Phe His Ile Ile Asp Asn Val Asp Leu Val	
465 470 475 480	
gtt tct gcc tac tgc tta aaa tac tgc tcc agc ttg agg aaa ctc tgt	1489
Val Ser Ala Tyr Cys Leu Lys Tyr Cys Ser Ser Leu Arg Lys Leu Cys	
485 490 495	

ttt tcc gtt caa aat gtc ttt aag aaa gag gat gaa cac agc tct acg Phe Ser Val Gln Asn Val Phe Lys Lys Glu Asp Glu His Ser Ser Thr 500 505 510	1537
tcg gat tac agc ctc atc tgt tgg cat cac atc tgc tct gtg ctc acc Ser Asp Tyr Ser Leu Ile Cys Trp His His Ile Cys Ser Val Leu Thr 515 520 525	1585
acc agc ggg cac ctc aga gag ctc cag gtg cag gac agc acc ctc agc Thr Ser Gly His Leu Arg Glu Leu Gln Val Gln Asp Ser Thr Leu Ser 530 535 540	1633
gag tcg acc ttt gtg acc tgg tgt aac cag ctg agg cat ccc agc tgt Glu Ser Thr Phe Val Thr Trp Cys Asn Gln Leu Arg His Pro Ser Cys 545 550 555 560	1681
cgc ctt cag aag ctt gga ata aat aac gtt tcc ttt tct ggc cag agt Arg Leu Gln Lys Leu Gly Ile Asn Asn Val Ser Phe Ser Gly Gln Ser 565 570 575	1729
gtt ctg ctc ttt gag gtg ctc ttt tat cag cca gac ttg aaa tac ctg Val Leu Leu Phe Glu Val Phe Tyr Gln Pro Asp Leu Lys Tyr Leu 580 585 590	1777
agc ttc acc ctc acg aaa ctc tct cgt gat gac atc agg tcc ctc tgt Ser Phe Thr Leu Thr Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys 595 600 605	1825
<i>A1</i> gat gcc ttg aac tac cca gca ggc aac gtc aaa gag cta gcg ctg gta Asp Ala Leu Asn Tyr Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val 610 615 620	1873
aat tgt cac ctc tca ccc att gat tgt gaa gtc ctt gct ggc ctt cta Asn Cys His Leu Ser Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu 625 630 635 640	1921
acc aac aac aag aag ctg acg tat ctg aat gta tcc tgc aac cag tta Thr Asn Asn Lys Lys Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu 645 650 655	1969
gac aca ggc gtg ccc ctt ttg tgt gaa gcc ctg tgc agc cca gac acg Asp Thr Gly Val Pro Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr 660 665 670	2017
gtc ctg gta tac ctg atg ttg gct ttc tgc cac ctc agc gag cag tgc Val Leu Val Tyr Leu Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys 675 680 685	2065
tgc gaa tac atc tct gaa atg ctt ctg cgt aac aag agc gtg cgc tat Cys Glu Tyr Ile Ser Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr 690 695 700	2113
cta gac ctc agt gcc aat gtc ctg aag gac gaa gga ctg aaa act ctc Leu Asp Leu Ser Ala Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu 705 710 715 720	2161

tgc gag gcc ttg aaa cat ccg gac tgc tgc ctg gat tca ctg tgt ttg		2209	
Cys Glu Ala Leu Lys His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu			
725	730	735	
gta aaa tgt ttt atc act gct gct ggc tgt gaa gac ctc gcc tct gct		2257	
Val Lys Cys Phe Ile Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala			
740	745	750	
ctc atc agc aat caa aac ctg aag att ctg caa att ggg tgc aat gaa		2305	
Leu Ile Ser Asn Gln Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu			
755	760	765	
atc gga gat gtg ggt gtg cag ctg ttg tgt cgg gct ctg acg cat acg		2353	
Ile Gly Asp Val Gly Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr			
770	775	780	
gat tgc cgc tta gag att ctt ggg ttg gaa gaa tgt ggg tta acg acg		2401	
Asp Cys Arg Leu Glu Ile Leu Gly Leu Glu Glu Cys Gly Leu Thr Ser			
785	790	795	800
acc tgc tgt aag gat ctc gcg tct gtt ctc acc tgc agt aag acc ctg		2449	
Thr Cys Cys Lys Asp Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu			
805	810	815	
cag cag ctc aac ctg acc ttg aac acc ttg gac cac aca ggg gtg gtt		2497	
Gln Gln Leu Asn Leu Thr Leu Asn Thr Leu Asp His Thr Gly Val Val			
820	825	830	
gta ctc tgt gag gcc ctg aga cac cca gag tgt gcc ctg cag gtg ctc		2545	
Val Leu Cys Glu Ala Leu Arg His Pro Glu Cys Ala Leu Gln Val Leu			
835	840	845	
ggg gtt gtt gca gga gta aga acc aag cag		2575	
Gly Val Val Ala Gly Val Arg Thr Lys Gln			
850	855		
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Ala Pro Lys Glu Ala Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly			
35 40 45			
Pro Gln Gly Ile Gly Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala			
50 55 60			
Trp Ser Asp Asn Lys Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr			
65 70 75 80			
Phe Cys Cys Arg Glu Leu Arg Glu Leu Pro Pro Thr Ser Leu Ala Asp			
85 90 95			
Leu Ile Ser Arg Glu Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile			
100 105 110			

A1

Val Ser Gln Pro Glu Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu  
 115 120 125  
 Leu Gln Gly Gly Leu Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu  
 130 135 140  
 Met Glu Lys Arg Pro Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys  
 145 150 155 160  
 Lys Met Leu Pro Glu Ala Ser Leu Leu Ile Ala Ile Lys Pro Val Cys  
 165 170 175  
 Pro Lys Glu Leu Arg Asp Gln Val Thr Ile Ser Glu Ile Tyr Gln Pro  
 180 185 190  
 Arg Gly Phe Asn Glu Ser Asp Arg Leu Val Tyr Phe Cys Cys Phe Phe  
 195 200 205  
 Lys Asp Pro Lys Arg Ala Met Glu Ala Phe Asn Leu Val Arg Glu Ser  
 210 215 220  
 Glu Gln Leu Phe Ser Ile Cys Gln Ile Pro Leu Leu Cys Trp Ile Leu  
 225 230 235 240  
 Cys Thr Ser Leu Lys Gln Glu Met Gln Lys Gly Lys Asp Leu Ala Leu  
 245 250 255  
 Thr Cys Gln Ser Thr Thr Ser Val Tyr Ser Ser Phe Val Phe Asn Leu  
 260 265 270  
 Phe Thr Pro Glu Gly Ala Glu Gly Pro Thr Pro Gln Thr Gln His Gln  
 275 280 285  
 Leu Lys Ala Leu Cys Ser Leu Ala Ala Glu Gly Met Trp Thr Asp Thr  
 290 295 300  
 Phe Glu Phe Cys Glu Asp Asp Leu Arg Arg Asn Gly Val Val Asp Ala  
 305 310 315 320  
 Asp Ile Pro Ala Leu Leu Gly Thr Lys Ile Leu Leu Lys Tyr Gly Glu  
 325 330 335  
 Arg Glu Ser Ser Tyr Val Phe Leu His Val Cys Ile Gln Glu Phe Cys  
 340 345 350  
 Ala Ala Leu Phe Tyr Leu Leu Lys Ser His Leu Asp His Pro His Pro  
 355 360 365  
 Ala Val Arg Cys Val Gln Glu Leu Leu Val Ala Asn Phe Glu Lys Ala  
 370 375 380  
 Arg Arg Ala His Trp Ile Phe Leu Gly Cys Phe Leu Thr Gly Leu Leu  
 385 390 395 400  
 Asn Lys Lys Glu Gln Glu Lys Leu Asp Ala Phe Phe Gly Phe Gln Leu  
 405 410 415  
 Ser Gln Glu Ile Lys Gln Gln Ile His Gln Cys Leu Lys Ser Leu Gly  
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 Cys Leu Phe Glu Met Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn  
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 Ser Asp Tyr Ser Leu Ile Cys Trp His His Ile Cys Ser Val Leu Thr  
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A1

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 Thr Asn Asn Lys Lys Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu  
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 Met Thr Ser Pro Gln Leu Glu Trp Thr Leu Gln Thr Leu Leu Glu Gln  
 1 5 10 15  
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 Leu Asn Glu Asp Glu Leu Lys Ser Phe Lys Ser Leu Leu Trp Ala Phe  
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 Pro Leu Glu Asp Val Leu Gln Lys Thr Pro Trp Ser Glu Val Glu Glu  
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 gct gat ggc aag aaa ctg gca gaa att ctg gtc aac acc tcc tca gaa 250  
 Ala Asp Gly Lys Leu Ala Glu Ile Leu Val Asn Thr Ser Ser Glu  
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 Asn Trp Ile Arg Asn Ala Thr Val Asn Ile Leu Glu Glu Met Asn Leu  
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 acg gaa ttg tgt aag atg gca aag gct gag atg gag gac gga cag 346  
 Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln  
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 Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser  
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 gag tta gca aag cca ggt gaa aag gaa gga tgg aga aat tca atg gag 442  
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A1

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 Asn Phe His Asp Asp Val Thr Leu Arg Asn Gln Arg Phe Ile Pro Phe  
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cac ggc ccc gca ggc gtg ggg aaa acc acg ctg gcc aaa aag tgt atg 634  
 His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met  
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ctg gac tgg aca gac tgc aac ctc agc ccg acg ctc aga tac gcg ttc 682  
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tac ctc agc tgc aag gag ctc agc cgc atg ggc ccc tgc agt ttt gca 730  
 Tyr Leu Ser Cys Lys Glu Leu Ser Arg Met Gly Pro Cys Ser Phe Ala  
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gag ctg aaa gtc cca cct ggg gcg ctg atc cag gac atc tgc ggg gac 874  
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 Trp Glu Lys Lys Pro Val Pro Val Leu Leu Gly Ser Leu Leu Lys  
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agg aag atg tta ccc agg gca gcc ttg ctg gtc acc acg ccg ccc agg 970  
 Arg Lys Met Leu Pro Arg Ala Ala Leu Leu Val Thr Thr Arg Pro Arg  
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gtg gag ggc ttc ctg gag gag gac agg agg gcc tat ttc ctg aga cac 1066  
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 Val Cys Thr Thr Leu Lys Leu Gln Met Glu Lys Gly Glu Asp Pro Val  
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ccc acc tgc ctc acc cgc acg ggg ctg ttc ctg cgt ttc ctc tgc agc 1258  
 Pro Thr Cys Leu Thr Arg Thr Gly Leu Phe Leu Arg Phe Leu Cys Ser  
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 Glu Asp Leu Glu Arg Leu Gly Val Gln Glu Ser Asp Leu Arg Leu Phe  
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A/  
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 Ala Leu Glu Lys Glu Glu Gly Glu Asp Arg Asp Gly His Ala Trp Asp  
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 Ile Gly Asp Val Gln Lys Leu Leu Ser Gly Glu Glu Arg Leu Lys Asn  
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 Pro Asp Leu Ile Gln Val Gly His Phe Leu Phe Gly Leu Ala Asn Glu  
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 Lys Arg Ala Lys Glu Leu Glu Ala Thr Phe Gly Cys Arg Met Ser Pro  
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 Asp Ile Lys Gln Glu Leu Leu Gln Cys Lys Ala His Leu His Ala Asn  
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gca aag ggg gtg ttc ctg gag aat tac atg gat ttt gaa ctg gac att Ala Lys Gly Val Phe Leu Glu Asn Tyr Met Asp Phe Glu Leu Asp Ile 625 630 635 640	1978
gaa ttt gaa agg tgc act tac cta acc att ccg aac tgg gct cgg cag Glu Phe Glu Arg Cys Thr Tyr Leu Thr Ile Pro Asn Trp Ala Arg Gln 645 650 655	2026
gat ctt cgc tct ctt cgc ctc tgg aca gat ttc tgc tct ctc ttc agc Asp Leu Arg Ser Leu Arg Leu Trp Thr Asp Phe Cys Ser Leu Phe Ser 660 665 670	2074
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AI gac tct tct gtg cgg att ctt tgt gac cac gta acc cgt agc acc tgt Asp Ser Ser Val Arg Ile Leu Cys Asp His Val Thr Arg Ser Thr Cys 690 695 700	2170
cat ctg cag aaa gtg gag att aaa aac gtc acc cct gac acc gcg tac His Leu Gln Lys Val Glu Ile Lys Asn Val Thr Pro Asp Thr Ala Tyr 705 710 715 720	2218
cgg gac ttc tgt ctt gct ttc att ggg aag aag acc ctc acg cac ctg Arg Asp Phe Cys Leu Ala Phe Ile Gly Lys Lys Thr Leu Thr His Leu 725 730 735	2266
acc ctg gca ggg cac atc gag tgg gaa cgc acg atg atg ctg atg ctg Thr Leu Ala Gly His Ile Glu Trp Glu Arg Thr Met Met Leu Met Leu 740 745 750	2314
tgt gac ctg ctc aga aat cat aaa tgc aac ctg cag tac ctg agg ttg Cys Asp Leu Leu Arg Asn His Lys Cys Asn Leu Gln Tyr Leu Arg Leu 755 760 765	2362
gga ggt cac tgt gcc acc ccg gag cag tgg gct gaa ttc ttc tat gtc Gly Gly His Cys Ala Thr Pro Glu Gln Trp Ala Glu Phe Phe Tyr Val 770 775 780	2410
ctc aaa gcc aac cag tcc ctg aag cac ctg cgt ctc tca gcc aat gtg Leu Lys Ala Asn Gln Ser Leu Lys His Leu Arg Leu Ser Ala Asn Val 785 790 795 800	2458

ctc ctg gat gag ggt gcc atg ttg ctg tac aag acc atg aca cgc cca Leu Leu Asp Glu Gly Ala Met Leu Leu Tyr Lys Thr Met Thr Arg Pro 805 810 815	2506
aaa cac ttc ctg cag atg ttg tcg ttg gaa aac tgt cgt ctt aca gaa Lys His Phe Leu Gln Met Leu Ser Leu Glu Asn Cys Arg Leu Thr Glu 820 825 830	2554
gcc agt tgc aag gac ctt gct gtc ttg gtt gtc agc aag aag ctg Ala Ser Cys Lys Asp Leu Ala Ala Val Leu Val Ser Lys Lys Leu 835 840 845	2602
aca cac ctg tgc ttg gcc aag aac ccc att ggg gat aca ggg gtg aag Thr His Leu Cys Leu Ala Lys Asn Pro Ile Gly Asp Thr Gly Val Lys 850 855 860	2650
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aac cag ata gct cgt gga ttg tgg att ctc tgt cag gca tta gag aat Asn Gln Ile Ala Arg Gly Leu Trp Ile Leu Cys Gln Ala Leu Glu Asn 915 920 925	2842
cca aac tgt aac cta aaa cac cta cgg ttg aag acc tat gaa act aat Pro Asn Cys Asn Leu Lys His Leu Arg Leu Lys Thr Tyr Glu Thr Asn 930 935 940	2890
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ctg act att gat tgc aat gct tcc ggg gca acg gca cct ccg tgc tgt Leu Thr Ile Asp Cys Asn Ala Ser Gly Ala Thr Ala Pro Pro Cys Cys 965 970 975	2986
gac ttt ttt tgc tgagcagcct gggatcgctc tacgaattac acaggaagcg Asp Phe Phe Cys 980	3038
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Asn Trp Ile Arg Asn Ala Thr Val Asn Ile Leu Glu Glu Met Asn Leu  
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Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln  
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Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser  
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Glu Leu Ala Lys Pro Gly Glu Lys Glu Gly Trp Arg Asn Ser Met Glu  
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Lys Gln Ser Leu Val Trp Lys Asn Thr Phe Trp Gln Gly Asp Ile Asp  
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Asn Phe His Asp Asp Val Thr Leu Arg Asn Gln Arg Phe Ile Pro Phe  
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Leu Asn Pro Arg Thr Pro Arg Lys Leu Thr Pro Tyr Thr Val Val Leu  
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His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met  
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Leu Asp Trp Thr Asp Cys Asn Leu Ser Pro Thr Leu Arg Tyr Ala Phe  
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Tyr Leu Ser Cys Lys Glu Leu Ser Arg Met Gly Pro Cys Ser Phe Ala  
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Glu Leu Ile Ser Lys Asp Trp Pro Glu Leu Gln Asp Asp Ile Pro Ser  
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Ile Leu Ala Gln Ala Gln Arg Ile Leu Phe Val Val Asp Gly Leu Asp  
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Arg Lys Met Leu Pro Arg Ala Ala Leu Leu Val Thr Thr Arg Pro Arg  
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Leu Leu Ala Ala Gln Gly Leu Trp Ala Gln Met Ser Val Phe His Arg  
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A1

Glu Asp Leu Glu Arg Leu Gly Val Gln Glu Ser Asp Leu Arg Leu Phe  
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 Glu Ser Gln Glu Glu Glu Leu Ala Lys Val Val Val Ala Pro Phe Lys  
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 Lys His Phe Leu Gln Met Leu Ser Leu Glu Asn Cys Arg Leu Thr Glu  
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 Ala Ser Cys Lys Asp Leu Ala Ala Val Leu Val Val Ser Lys Lys Leu  
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 Phe Leu Cys Glu Gly Leu Ser Tyr Pro Asp Cys Lys Leu Gln Thr Leu  
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A1

Val Leu Gln Gln Cys Ser Ile Thr Lys Leu Gly Cys Arg Tyr Leu Ser  
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tcactgcagg tagcaaaggg	gggtttctgt	gagaattaca	tggatttga	actggacatt	1920
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A1

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Met	Ala	Glu	Ser	Asp	Ser	Thr	Asp	Phe	Asp	Leu	Leu	Trp	Tyr	Leu	Glu		
1	5									10				15			

aat ctc agt gac aag gaa ttt cag agt ttt aag aag tat ctg gca cgc 96

Asn	Leu	Ser	Asp	Lys	Glu	Phe	Gln	Ser	Phe	Lys	Lys	Tyr	Leu	Ala	Arg	
20					25								30			

aag att ctt gat ttc aaa ctg cca cag ttt cca ctg ata cag atg aca 144

Lys	Ile	Leu	Asp	Phe	Lys	Leu	Pro	Gln	Phe	Pro	Ile	Gln	Met	Thr	
35					40						45				

aaa gaa gaa ctg gct aac gtg ttg cca atc tct tat gag gga cag tat 192

Lys	Glu	Leu	Ala	Asn	Val	Leu	Pro	Ile	Ser	Tyr	Glu	Gly	Gln	Tyr	
50					55					60					

ata tgg aat atg ctc ttc agc ata ttt tca atg atg cgt aag gaa gat 240

Ile	Trp	Asn	Met	Leu	Phe	Ser	Ile	Phe	Ser	Met	Met	Arg	Lys	Glu	Asp
65				70						75		80			

ctt tgt agg aag atc att ggc aga cga aac cat gtg ttc tac ata ctt 288

Leu	Cys	Arg	Lys	Ile	Ile	Gly	Arg	Arg	Asn	His	Val	Phe	Tyr	Ile	Leu
85						90						95			

caa tta gcc tat gat tct acc agc tat tat tca gca aac aat ctc aat 336

Gln	Leu	Ala	Tyr	Asp	Ser	Thr	Ser	Tyr	Tyr	Ser	Ala	Asn	Asn	Leu	Asn
100						105					110				

gtg ttc ctg atg gga gag aga gca tct gga aaa act att gtt ata aat 384

Val	Phe	Leu	Met	Gly	Glu	Arg	Ala	Ser	Gly	Lys	Thr	Ile	Val	Ile	Asn
115						120					125				

ctg gct gtg ttg agg tgg atc aag ggt gag atg tgg cag aac atg atc Leu Ala Val Leu Arg Trp Ile Lys Gly Glu Met Trp Gln Asn Met Ile 130 135 140	432
tcg tac gtc gtt cac ctc act tct cac gaa ata aac cag atg acc aac Ser Tyr Val Val His Leu Thr Ser His Glu Ile Asn Gln Met Thr Asn 145 150 155 160	480
agc agc ttg gct gag cta atc gcc aag gac tgg cct gac ggc cag gct Ser Ser Leu Ala Glu Leu Ile Ala Lys Asp Trp Pro Asp Gly Gln Ala 165 170 175	528
ccc att gca gac atc ctg tct gat ccc aag aaa ctc ctt ttc att ctc Pro Ile Ala Asp Ile Leu Ser Asp Pro Lys Lys Leu Leu Phe Ile Leu 180 185 190	576
gag gac ttg gac aac ata aga ttc gag tta aat gtc aat gaa agt gct Glu Asp Leu Asp Asn Ile Arg Phe Glu Leu Asn Val Asn Glu Ser Ala 195 200 205	624
ttg tgt agt aac agc acc cag aaa gtt ccc att cca gtt ctc ctg gtc Leu Cys Ser Asn Ser Thr Gln Lys Val Pro Ile Pro Val Leu Leu Val 210 215 220	672
agt ttg ctg aag aga aaa atg gct cca ggc tgc tgg ttc ctc atc tcc Ser Leu Leu Lys Arg Lys Met Ala Pro Gly Cys Trp Phe Leu Ile Ser 225 230 235 240	720
tca agg ccc aca cgt ggg aat aat gta aaa acg ttc ttg aaa gag gta Ser Arg Pro Thr Arg Gly Asn Asn Val Lys Thr Phe Leu Lys Glu Val 245 250 255	768
gat tgc tgc acg acc ttg cag ctg tcg aat ggg aag agg gag ata tat Asp Cys Cys Thr Thr Leu Gln Leu Ser Asn Gly Lys Arg Glu Ile Tyr 260 265 270	816
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tta tgc tgg atc acg tgt act gtc ctg aag cgg cag atg gac aag ggg Leu Cys Trp Ile Thr Cys Thr Val Leu Lys Arg Gln Met Asp Lys Gly 305 310 315 320	960
cgt gac ttc cag ctc tgc tgc caa aca ccc act gat cta cat gcc cac Arg Asp Phe Gln Leu Cys Cys Gln Thr Pro Thr Asp Leu His Ala His 325 330 335	1008
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A1

tat cac cta ggt ctc cta aaa cgt ctg tgt ttg ctg gct gca gga gga		1104
Tyr His Leu Gly Leu Leu Lys Arg Leu Cys Leu Leu Ala Ala Gly Gly		
355	360	365
ctg ttt ctg agc acc ctg aat ttc agt ggt gaa gac ctc aga tgt gtt		1152
Leu Phe Leu Ser Thr Leu Asn Phe Ser Gly Glu Asp Leu Arg Cys Val		
370	375	380
ggg ttt act gag gct gat gtc tct gtg ttg cag gcc gcg aat att ctt		1200
Gly Phe Thr Glu Ala Asp Val Ser Val Leu Gln Ala Ala Asn Ile Leu		
385	390	395
ttg ccg agc aac act cat aaa gac cgt tac aag ttc ata cac ttg aac		1248
Leu Pro Ser Asn Thr His Lys Asp Arg Tyr Lys Phe Ile His Leu Asn		
405	410	415
gtc cag gag ttt tgt aca gcc att gca ttt ctg atg gca gta ccc aac		1296
Val Gln Glu Phe Cys Thr Ala Ile Ala Phe Leu Met Ala Val Pro Asn		
420	425	430
tat ctg atc ccc tca ggc agc aga gag tat aaa gag aag aga gaa caa		1344
Tyr Leu Ile Pro Ser Gly Ser Arg Glu Tyr Lys Glu Lys Arg Glu Gln		
435	440	445
tac tct gac ttt aat caa gtg ttt act ttc att ttt ggt ctt cta aat		1392
Tyr Ser Asp Phe Asn Gln Val Phe Thr Phe Ile Phe Gly Leu Leu Asn		
450	455	460
A1 gca aac agg aga aag att ctt gag aca tcc ttt gga tac cag cta ccg		1440
Ala Asn Arg Arg Lys Ile Leu Glu Thr Ser Phe Gly Tyr Gln Leu Pro		
465	470	475
atg gta gac agc ttc aag tgg tac tcg gtg gga tac atg aaa cat ttg		1488
Met Val Asp Ser Phe Lys Trp Tyr Ser Val Gly Tyr Met Lys His Leu		
485	490	495
gac cgt gac ccg gaa aag ttg acg cac cat atg cct ttg ttt tac tgt		1536
Asp Arg Asp Pro Glu Lys Leu Thr His His Met Pro Leu Phe Tyr Cys		
500	505	510
ctc tat gag aat cgg gaa gaa ttt gtg aag acg att gtg gat gct		1584
Leu Tyr Glu Asn Arg Glu Glu Phe Val Lys Thr Ile Val Asp Ala		
515	520	525
ctc atg gag gtt aca gtt tac ctt caa tca gac aag gat atg atg gtc		1632
Leu Met Glu Val Thr Val Tyr Leu Gln Ser Asp Lys Asp Met Met Val		
530	535	540
tca tta tac tgt ctg gat tac tgc tgt cac ctg agg aca ctt aag ttg		1680
Ser Leu Tyr Cys Leu Asp Tyr Cys Cys His Leu Arg Thr Leu Lys Leu		
545	550	555
agt gtt cag cgc atc ttt caa aac aaa gag cca ctt ata agg cca act		1728
Ser Val Gln Arg Ile Phe Gln Asn Lys Glu Pro Leu Ile Arg Pro Thr		
565	570	575

gct agt caa atg aag agc ctt gtc tac tgg aga gag atc tgc tct ctt		1776	
Ala Ser Gln Met Lys Ser Leu Val Tyr Trp Arg Glu Ile Cys Ser Leu			
580	585	590	
ttt tat aca atg gag agc ctc cgg gag ctg cat atc ttt gac aat gac		1824	
Phe Tyr Thr Met Glu Ser Leu Arg Glu Leu His Ile Phe Asp Asn Asp			
595	600	605	
ctt aat ggt att tca gaa agg att ctg tct aaa gcc ctg gag cat tct		1872	
Leu Asn Gly Ile Ser Glu Arg Ile Leu Ser Lys Ala Leu Glu His Ser			
610	615	620	
agc tgt aaa ctt cgc aca ctc aag ttg tcc tat gtc tcg act gct tct		1920	
Ser Cys Lys Leu Arg Thr Leu Lys Leu Ser Tyr Val Ser Thr Ala Ser			
625	630	635	640
ggg ttt gaa gac tta ctc aag gct ttg gct cgt aat cgg agc ctg aca		1968	
Gly Phe Glu Asp Leu Leu Lys Ala Leu Ala Arg Asn Arg Ser Leu Thr			
645	650	655	
tac ctg agt atc aac tgt acg tcc att tcc cta aat atg ttt tca ctt		2016	
Tyr Leu Ser Ile Asn Cys Thr Ser Ile Ser Leu Asn Met Phe Ser Leu			
660	665	670	
ctg cat gac atc ctg cac gag ccc aca tgc caa ata agt cat ctg agc		2064	
Leu His Asp Ile Leu His Glu Pro Thr Cys Gln Ile Ser His Leu Ser			
675	680	685	
ttg atg aaa tgt gat ttg cga gcc agc gaa tgc gaa atc gcc tct		2112	
Leu Met Lys Cys Asp Leu Arg Ala Ser Glu Cys Glu Glu Ile Ala Ser			
690	695	700	
ctc ctc atc agt ggc ggg agt ctg aga aaa ctg acc tta tcc agc aat		2160	
Leu Leu Ile Ser Gly Gly Ser Leu Arg Lys Leu Thr Leu Ser Ser Asn			
705	710	715	720
ccg ctg agg agc gac ggg atg aac ata ctg tgt gat gcc ttg ctt cat		2208	
Pro Leu Arg Ser Asp Gly Met Asn Ile Leu Cys Asp Ala Leu Leu His			
725	730	735	
ccc aac tgc act ctt ata tca ctg gtt ctg tct ggc tgt ttc ttt agc		2256	
Pro Asn Cys Thr Leu Ile Ser Leu Val Leu Ser Gly Cys Phe Phe Ser			
740	745	750	
agc gat atc tgt caa tat att gcc ata gtt att gct act aat gaa aaa		2304	
Ser Asp Ile Cys Gln Tyr Ile Ala Ile Val Ile Ala Thr Asn Glu Lys			
755	760	765	
ctg agg agc ctg gag att ggg agc aac aaa ata gaa gat gca gga atg		2352	
Leu Arg Ser Leu Glu Ile Gly Ser Asn Lys Ile Glu Asp Ala Gly Met			
770	775	780	
cag ctg cta tgt ggt ttg aga cat ccc aac tgc atg ttg gtg aat		2400	
Gln Leu Leu Cys Gly Gly Leu Arg His Pro Asn Cys Met Leu Val Asn			
785	790	795	800

A1

att ggg cta gaa gag tgc atg tta acc agt gcc tgc tgt cga tct ctt		2448
Ile Gly Leu Glu Glu Cys Met Leu Thr Ser Ala Cys Cys Arg Ser Leu		
805	810	815
gcc tct gtt ctt acc acc aac aaa aca cta gaa aga ctc aac ttg ctt		2496
Ala Ser Val Leu Thr Thr Asn Lys Thr Leu Glu Arg Leu Asn Leu Leu		
820	825	830
caa aat cac ttg ggc aat gat gga gtt gca aaa ctt ctt gag agc ttg		2544
Gln Asn His Leu Gly Asn Asp Gly Val Ala Lys Leu Glu Ser Leu		
835	840	845
atc agc cca gat tgt gta ctt aag gta gtt ggc ttg atg gct gct gag		2592
Ile Ser Pro Asp Cys Val Leu Lys Val Val Gly Leu Met Ala Ala Glu		
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aac atg gag tcc ctc att ccc agg cca gca cgc tga		2628
Asn Met Glu Ser Leu Ile Pro Arg Pro Ala Arg		
865	870	875
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Lys Ile Leu Asp Phe Lys Leu Pro Gln Phe Pro Leu Ile Gln Met Thr		
35 40 45		
Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr		
50 55 60		
Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp		
65 70 75 80		
Leu Cys Arg Lys Ile Ile Gly Arg Arg Asn His Val Phe Tyr Ile Leu		
85 90 95		
Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Ser Ala Asn Asn Leu Asn		
100 105 110		
Val Phe Leu Met Gly Glu Arg Ala Ser Gly Lys Thr Ile Val Ile Asn		
115 120 125		
Leu Ala Val Leu Arg Trp Ile Lys Gly Glu Met Trp Gln Asn Met Ile		
130 135 140		
Ser Tyr Val Val His Leu Thr Ser His Glu Ile Asn Gln Met Thr Asn		
145 150 155 160		
Ser Ser Leu Ala Glu Leu Ile Ala Lys Asp Trp Pro Asp Gly Gln Ala		
165 170 175		
Pro Ile Ala Asp Ile Leu Ser Asp Pro Lys Lys Leu Leu Phe Ile Leu		
180 185 190		
Glu Asp Leu Asp Asn Ile Arg Phe Glu Leu Asn Val Asn Glu Ser Ala		
195 200 205		
Leu Cys Ser Asn Ser Thr Gln Lys Val Pro Ile Pro Val Leu Leu Val		
210 215 220		
Ser Leu Leu Lys Arg Lys Met Ala Pro Gly Cys Trp Phe Leu Ile Ser		
225 230 235 240		

A1

Ser Arg Pro Thr Arg Gly Asn Asn Val Lys Thr Phe Leu Lys Glu Val  
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 Asp Cys Cys Thr Thr Leu Gln Leu Ser Asn Gly Lys Arg Glu Ile Tyr  
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 Phe Asn Ser Phe Phe Lys Asp Arg Gln Arg Ala Ser Ala Ala Leu Gln  
                  275                 280                 285  
 Leu Val His Glu Asp Glu Ile Leu Val Gly Leu Cys Arg Val Ala Ile  
                  290                 295                 300  
 Leu Cys Trp Ile Thr Cys Thr Val Leu Lys Arg Gln Met Asp Lys Gly  
                  305                 310                 315                 320  
 Arg Asp Phe Gln Leu Cys Cys Gln Thr Pro Thr Asp Leu His Ala His  
                  325                 330                 335  
 Phe Leu Ala Asp Ala Leu Thr Ser Glu Ala Gly Leu Thr Ala Asn Gln  
                  340                 345                 350  
 Tyr His Leu Gly Leu Leu Lys Arg Leu Cys Leu Leu Ala Ala Gly Gly  
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 Leu Phe Leu Ser Thr Leu Asn Phe Ser Gly Glu Asp Leu Arg Cys Val  
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 Gly Phe Thr Glu Ala Asp Val Ser Val Leu Gln Ala Ala Asn Ile Leu  
                  385                 390                 395                 400  
 Leu Pro Ser Asn Thr His Lys Asp Arg Tyr Lys Phe Ile His Leu Asn  
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 Val Gln Glu Phe Cys Thr Ala Ile Ala Phe Leu Met Ala Val Pro Asn  
                  420                 425                 430  
 Tyr Leu Ile Pro Ser Gly Ser Arg Glu Tyr Lys Glu Lys Arg Glu Gln  
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 Tyr Ser Asp Phe Asn Gln Val Phe Thr Phe Ile Phe Gly Leu Leu Asn  
                  450                 455                 460  
 Ala Asn Arg Arg Lys Ile Leu Glu Thr Ser Phe Gly Tyr Gln Leu Pro  
                  465                 470                 475                 480  
 Met Val Asp Ser Phe Lys Trp Tyr Ser Val Gly Tyr Met Lys His Leu  
                  485                 490                 495  
 Asp Arg Asp Pro Glu Lys Leu Thr His His Met Pro Leu Phe Tyr Cys  
                  500                 505                 510  
 Leu Tyr Glu Asn Arg Glu Glu Phe Val Lys Thr Ile Val Asp Ala  
                  515                 520                 525  
 Leu Met Glu Val Thr Val Tyr Leu Gln Ser Asp Lys Asp Met Met Val  
                  530                 535                 540  
 Ser Leu Tyr Cys Leu Asp Tyr Cys Cys His Leu Arg Thr Leu Lys Leu  
                  545                 550                 555                 560  
 Ser Val Gln Arg Ile Phe Gln Asn Lys Glu Pro Leu Ile Arg Pro Thr  
                  565                 570                 575  
 Ala Ser Gln Met Lys Ser Leu Val Tyr Trp Arg Glu Ile Cys Ser Leu  
                  580                 585                 590  
 Phe Tyr Thr Met Glu Ser Leu Arg Glu Leu His Ile Phe Asp Asn Asp  
                  595                 600                 605  
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                  625                 630                 635                 640  
 Gly Phe Glu Asp Leu Leu Lys Ala Leu Ala Arg Asn Arg Ser Leu Thr  
                  645                 650                 655  
 Tyr Leu Ser Ile Asn Cys Thr Ser Ile Ser Leu Asn Met Phe Ser Leu  
                  660                 665                 670  
 Leu His Asp Ile Leu His Glu Pro Thr Cys Gln Ile Ser His Leu Ser  
                  675                 680                 685

A1

Leu	Met	Lys	Cys	Asp	Leu	Arg	Ala	Ser	Glu	Cys	Glu	Glu	Ile	Ala	Ser
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Leu	Leu	Ile	Ser	Gly	Gly	Ser	Leu	Arg	Lys	Leu	Thr	Leu	Ser	Ser	Asn
705					710					715					720
Pro	Leu	Arg	Ser	Asp	Gly	Met	Asn	Ile	Leu	Cys	Asp	Ala	Leu	Leu	His
					725				730						735
Pro	Asn	Cys	Thr	Leu	Ile	Ser	Leu	Val	Leu	Ser	Gly	Cys	Phe	Phe	Ser
					740			745							750
Ser	Asp	Ile	Cys	Gln	Tyr	Ile	Ala	Ile	Val	Ile	Ala	Thr	Asn	Glu	Lys
					755			760							765
Leu	Arg	Ser	Leu	Glu	Ile	Gly	Ser	Asn	Lys	Ile	Glu	Asp	Ala	Gly	Met
					770			775			780				
Gln	Leu	Leu	Cys	Gly	Gly	Leu	Arg	His	Pro	Asn	Cys	Met	Leu	Val	Asn
785					790				795						800
Ile	Gly	Leu	Glu	Glu	Cys	Met	Leu	Thr	Ser	Ala	Cys	Cys	Arg	Ser	Leu
					805			810							815
Ala	Ser	Val	Leu	Thr	Thr	Asn	Lys	Thr	Leu	Glu	Arg	Leu	Asn	Leu	Leu
					820			825							830
Gln	Asn	His	Leu	Gly	Asn	Asp	Gly	Val	Ala	Lys	Leu	Leu	Glu	Ser	Leu
					835			840							845
Ile	Ser	Pro	Asp	Cys	Val	Leu	Lys	Val	Val	Gly	Leu	Met	Ala	Ala	Glu
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